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BOARD OF PATENT APPEALS
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPEAL NO:

In re Application of
W. Benman
Serial No.: 09/363,456
Filed: July 29, 1999
For: SYSTEM AND METHOD FOR
EXTRACTING IMAGES WITHOUT
MONOCHROMATIC BACKGROUND

APPELLANT'S BRIEF

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TOPICAL INDEX

Virtual-2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Group Art Unit: 2671
W. Benman	:	Examiner: H. Cao
Serial No.: 09/363,456	:	Date: April 21, 2003
Filed: July 29, 1999	:	
For: SYSTEM AND METHOD FOR	:	
EXTRACTING IMAGES WITHOUT	:	
MONOCHROMATIC BACKGROUND	:	

APPELLANT'S BRIEF ON APPEAL

Honorable Assistant Commissioner
for Patents
Washington, D.C. 20231

Sir:

Appellant herein files an Appeal Brief drafted in accordance with the provisions of 37 C.F.R. § 1.192(c) as follows:

I. REAL PARTY IN INTEREST

The real party in interest is the Applicant, William J. Benman.

II. RELATED APPEALS AND INTERFERENCES

Applicant is not aware of any related appeals and/or interferences.

III. STATUS OF CLAIMS

Claims 1 – 17 were filed and Claims 2 and 13 were later canceled during prosecution.

During prosecution, new Claims 18 – 20 were added. Claims 18 – 20 were not amended.

An Amendment After Final is filed herewith to amend Claims 7 and 14.

The final rejection of Claims 1, 3 – 12 and 14 - 20 set forth in the Office Action of November 21, 2002 is being appealed. That is, Claims 1, 3 – 12 and 14 - 20 are appealed.

A copy of these claims is found in the Appendix.

IV. STATUS OF AMENDMENTS

An Amendment After Final is filed herewith amending Claims 7 and 14 and placing these claims in proper form for appeal. Interviews were conducted with the Examiner and the Examiner's Supervisor. A copy of the Applicant's Summary of an interview of the Examiner's Supervisor on February 21, 2003 and a copy of the Examiner's Supervisor's Summary are enclosed herewith as Exhibits A and B.

V. SUMMARY OF THE INVENTION

The present invention addresses the need in the art for an image processing system or technique for extracting a desired image from a scene regardless of the background in the scene. Generally, the inventive system includes an arrangement for providing image data. A memory is provided for storing a first frame of image data consisting of a heterogeneous background scene. Next, the user provides an object as a foreground image into the scene, with the same background. This image is treated as a second frame of image data. In accordance with the invention, the second frame is processed to extract the foreground imagery therefrom. That is, the inventive system strips the background imagery from the second frame without using monochromatic screens or filters.

VI. ISSUES

The issues presented are:

1. whether Claims 1, 3 – 12, and 14 – 20 are unpatentable under 35 U.S.C. § 103(a) over Parulski *et al.* (U.S. Patent No. 6,366,316), hereinafter "Parulski", in view of Adelson (U. S. Patent No. 5,706,417), hereinafter "Adelson";

2. whether Claims 19 and 20 are unpatentable under 35 U.S.C. § 103(a) over Parulski in view of Adelson and further in view of Astle *et al.* (U.S. Patent No. 4,827,344), hereinafter "Astle"; and

3. whether Claims 1, 3 – 12 and 14 – 17 conflict with Claims 1 – 17 of Application No. 09/363,771.

VII. GROUPING OF CLAIMS

Appellant hereby states that Claims 1, 3 – 12, and 14 – 20 do not stand or fall together.

VIII. ARGUMENTS

A. Summary of the Applied Rejections

In the above-identified Office Action, after initially allowing Claims 7 - 16, the Examiner entered a final rejection of Claims 1, 3 – 12 and 14 – 20 under 35 U.S.C. § 103(a) as being unpatentable over Parulski in view of Adelson. Claims 19 and 20 are were rejected as being unpatentable under 35 U.S.C. § 103(a) over Parulski in view of Adelson and further in view of Astle. Claims 1, 3 – 12 and 14 – 17 were presumably rejected as conflicting with Claims 1 – 17 of Application No. 09/363,771.

Appellant respectfully requests that the Board reverse the Examiner's final rejection of Claims 1, 3 – 12, and 14 – 20 under 35 U.S.C. § 103(a) and take note of the fact that the 09/363,771 application has been abandoned. (See the Notice of Abandonment enclosed herewith as Exhibit C.)

B. The Cited Prior Art

Parulski purports to teach an electronic system for generating a composite image using the **difference** of two images. As discussed more fully below, Parulski's system differs from the claimed invention in that it uses neither pixel-by-pixel **comparison** nor **differentiation**. Instead, Parulski's electronic imaging system includes a portable electronic camera operable in a compositing mode and a separate processor for compositing images using the **difference** of two images. This is illustrated in Fig. 1 of the reference. At step 14, a first image is captured with people or objects of interest in front of a stationary background. At step 16, the people or objects of interest are moved out of the cameras field of view. At step 18, a second image is captured of the background only. Then, at step 24, a foreground mask is created using the **difference** between the first and the second images. The foreground mask is then used at step 26 to create a

new composite image with the people or object of interest in the foreground and a new background.

Fig. 2 shows the process for creating the foreground mask using the difference between the two images. Figs. 6A and 6B provide further details on the process for creating the foreground mask in accordance with the teachings of this reference.

Adelson purports to teach a layered representation for image coding. This reference teaches a technique for image compression and decompression by which layers are separated using motion vectors, encoded and decoded, and recombined. See col. 4, lines 16 – 21.

Astle purports to show apparatus for inserting part of one video image into another video image.

C. Claims 1, 3 - 12, and 14 - 20 are not unpatentable under 103(a) over Parulski et al. in view of Adelson

The key issue with respect to this Appeal is whether Parulski, taken alone or in combination with Adelson, teaches, discloses or suggests the invention as claimed, particularly with respect to the fourth means. Claim 1 calls for:

> 1. A system for extracting an image comprising:
> first means for providing image data;
> second means responsive to said first means for storing a first frame of image data consisting of a heterogeneous background scene;
> third means responsive to said first means for providing a second frame of image data consisting of a second scene having said background scene at least partially obscured by a foreground object; and
> fourth means responsive to said second and third means for processing said second frame to extract an image of said object independent of said background scene, said fourth means including:
> **means for comparing picture elements of said second frame to corresponding picture elements in said first frame; and**
> **means for outputting said corresponding picture elements in said second frame if the result of the comparison is a predetermined value.** (Emphasis added.)

None of the references, including those cited but not applied, taken alone or in combination teaches, discloses or suggests the invention as presently claimed. That is, none of the references teaches a system for extracting an image of an object, from a heterogeneous background scene, having means for **comparing** picture elements (pixels) of a current frame to those of a stored frame and selectively outputting picture elements in the current frame based on the result of the comparison.

In the Office Action dated November 21, 2002, the Examiner finally rejected Claims 1, 3 – 12 and 14 – 20 under 35 U.S.C. § 103(a) as being unpatentable over Parulski in view of Adelson. On page 2, the Examiner suggested that Parulski teaches the claimed system for ". . . transplanting an image from a first scene to a second scene . . . ." At the outset, this suggests that the Examiner did not consider the changes to the claims submitted by Appellant in Amendments A and B inasmuch as the 'transplanting' language was replaced by 'extracting' language.

The Examiner went on the suggest that Parulski showed the first, second, third and fourth means as claimed. Appellant takes issue with this rejection, particularly with respect to the fourth means. That is, with respect to the fourth means, the Examiner asserted that in Fig. 1, element 22, Parulski shows an image of the object independent of the background. However, this image merely shows the foreground mask and is devoid of the image of the person 12' in the first frame. In any event, this misses the point, inasmuch as the question is whether the reference, in combination with Adelson, teaches the means for providing the functions recited. In this regard, the Examiner suggests that at col. 6, lines 8-11, Parulski discloses means for comparing picture elements of the second frame to corresponding picture elements in the first frame. However, col. 6, lines 8-11 of Parulski read as follows:

> "In now converting back to a high resolution mask, ambiguities can develop in the boundary regions between foreground and background. These contour areas are refined using the full resolution . . . ."

Inasmuch as it is not clear whether the Examiner was referring to Parulski or Adelson here, col. 6, lines 8-11 of Adelson is provided below:

> "For the moment, it is assumed that there is no motion-blur or focus-blur near the edge of the baseball. Accordingly, points on the attenuation map corresponding to the position of the baseball have a value of zero, corresponding to full . . . "

In the Response to Arguments section, the Examiner suggested that at col. 2, lines 44-51, Parulski teaches pixel-by-pixel comparison. However, this passage only teaches that a mask is generated using the differencing process discussed above:

> "A mask 22 is generated in a foreground mask generation step 24 based on the difference between the first and second images 12,18. The foreground mask 22 is used to extract a foreground image 12' from the first image 12 in a compositing step 26, wherein a new background 28 selected from a group of stored background images (step 30) is combined with the extracted foreground to provide a composite image 32 with the new background."

Those skilled in the art will appreciate that a differencing operation is substantially different from a comparison operation. If two pixels x and y are represented in an a binary manner, the differences between a logical compare and a logical subtraction or differencing operation may be seen most clearly in the following truth table:

Table I

x	y	x compared to y	difference between x and y
0	0	1	0
1	0	0	1
0	1	0	-1
1	1	1	0

Moreover, in an imaging application, pixels are not simply represented by a single binary number. Where no color is employed, each pixel may be represented in a grayscale scheme by which a number is assigned to each pixel that correlates to the spectrum of gray between black and white. In a color image, each pixel may be represented with three numeric values between 0 and a number (e.g. 255 or higher) which represents the intensity of the pixel with respect to the colors red (R), green (G) and blue (B). Thus an RGB representation for a pixel (x) in a first frame might be 219, 155, 37 while that of a corresponding pixel (y) in a second frame might be 182, 223, 310. Hence, the compare and difference operations would yield:

Table II

x	y	x **compared to** y	**difference between** x **and** y
219, 155, 37	182, 223, 310	0,0,0	37,-68,-273

Clearly, whether the pixels are represented in a binary form or as an integer value, a compare operation will be substantially different in manner and result from a differencing operation.

Hence, the question Appellant has asked repeatedly is: where in these passages is the alleged teaching of pixel-by-pixel **comparison** (as opposed to subtraction) of two images? That is, where in this passage (or elsewhere in the reference) is there a teaching of pixel-by-pixel comparison of two frames and the selective gating of the output of the current frame in response to the result of the comparison process ?

In an apparent admission that no means are shown in these references for effecting pixel-by-pixel comparison, at the end of the second paragraph of page 3, the Examiner went on to suggest that:

> "It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a comparing means for comparing picture element in order to decide whether if the desired picture will be outputted."

Notwithstanding this contradiction, that is, notwithstanding the fact that the Examiner asserted that the references teach pixel by pixel comparison and then made the implicit admission that the references do not teach pixel by pixel comparison, the Examiner provided no support for the assertion that it would have been obvious to one of ordinary skill in the art to include a comparing means for comparing picture elements in order to decide whether a desire picture element will be output. That is, the Examiner failed to perform the analysis required by *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). As set forth in MPEP §706.02(j):

> "35 U.S.C. 103 authorizes a rejection where, to meet the claim, it is necessary to modify a single reference or to combine it with one or more other references. After indicating that the rejection is under 35 U.S.C. 103, the examiner should set forth in the Office action:
>
> (A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,
>
> (B) the difference or differences in the claim over the applied reference(s),
>
> (C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and
>
> (D) **an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.**
>
> **To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.** Second, there must be a reasonable expectation of success. **Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.
>
> The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985)." (Emphasis added.)

In this case, the Examiner failed, *inter alia,* to provide an explanation as to why one of ordinary skill in the art would be motivated to modify the teachings of Parulski and/or Adelson to arrive at the subject matter of the rejected claims. That is, why would one of ordinary skill in the art modify the teachings of Parulski or Adelson to provide a pixel-by-pixel comparison? Parulski purports to achieve an extraction of a foreground object or background scene using a **differencing** scheme. Where is the motivation to use a pixel-by-pixel **comparison** approach?

Adelson purports to teach a technique for image compression and decompression using an encoding and decoding scheme. Clearly, Adelson does not teach image object extraction using a pixel-by-pixel **comparison** of first and second frames. Moreover, there is no motivation for one skilled in the art to employ a pixel-by-pixel comparison in connection with the teachings of Adelson alone or in combination with Parulski.

The Examiner has failed to provide one or more references that teach pixel-by-pixel comparison at the time of Appellant's invention. That is, even when combined, the teachings of Parulski and Adelson still fail to teach the invention as claimed inasmuch as neither Parulski nor Adelson teach pixel-by-pixel comparison of two frames. At best, Adelson teaches a pixel-by-pixel operation for encoding or decoding purposes, but clearly, Adelson fails to teach, show or suggest a pixel-by-pixel **comparison of two frames.**

Claim 17 is a method claim drawn along the lines of Claim 1. For the reasons set forth above, the rejections of Claims 1, 17 and the claims dependent thereon are improper and should be reversed. The Board's consideration and reversal of these rejections is respectfully requested.

Claim 7 calls for:

> 7. A system for extracting images comprising:
> first means for providing image data;
> second means responsive to said first means for storing a first frame of image data consisting of a heterogeneous background scene;
> third means responsive to said first means for providing a second frame of image data consisting of a second scene having said background scene at least partially obscured by a foreground object;
> fourth means for subtracting said first frame from said second frame and providing a difference frame;

> fifth means for processing said difference frame to provide a template, said fifth means including **means for differentiating said difference frame** to provide said template; and
>
> sixth means for multiplying said second frame by said template to extract an image consisting essentially of said foreground object.
>
> (Emphasis added.)

None of the references, including those cited but not applied, teach, disclose or suggest a system for extracting images including means for differentiating a difference frame to provide a template used to extract an image. In the Final Rejection, at page 4, the Examiner asserted:

> "Claim 7 is similar to claim 1, except for the steps of: fifth means for processing said difference frame to provide a template, said fifth means including means for differentiating said filtered image to provide said template and sixth means for multiplying said second frame by said template to extract an image consisting essentially of said foreground object which Parulski teaches in the processing steps are used to create a suitable foreground mask, col. 3, lines 27-52."

However, the teaching of Parulski cited by the Examiner, col. 3, lines 27-52, reads as follows:

> The two images are then processed by the computer 44 as shown in FIG. 2 and the composite image is displayed on a monitor 64 (FIG. 3A) or produced on a printer (not shown). During processing in the computer 44, the second image 18 is subtracted from the first image 12 in a differencing section 70 in order to generate a foreground mask image. (For further information about related differencing techniques, see, e.g., a doctoral dissertation of Michael Kelly located in the Stanford University library (Visual Identification of People by Computer, by Michael D. Kelly, Stanford University (computer science), Ph.D. thesis, 1970). Because the background areas are substantially the same in both images, the result should be an image that is approximately 0 in background areas where the desired subject was not present. Because the subject area is only found in the first image 12, the result should be an image that is generally non-zero in subject areas where the subject was present. However, all pixels in the background areas will not be exactly 0, since there will be some level of noise in the camera. Moreover, for certain subjects and backgrounds, some pixels in the differenced "subject" area may be approximately zero, if the brightness and color of these pixels in the subject and background are nearly identical. Therefore, additional processing steps are used to

> create a suitable foreground mask image. In particular, a noise reduction algorithm is used to reduce noise in the difference image

Clearly, no mention of differentiation is made in this passage. Hence, it is clear that the Examiner's rejection is based on the loose mistaken notion that Parulski is 'sort of doing the same thing' and therefore the claims are not patentable. In short, the Examiner is giving no patentable weight to the express language of the claims.

Perhaps the Examiner is confusing 'differencing' with 'differentiation'. 'Differencing' has to do with a subtraction process by which two frames are subtracted from another in a manner such as that purportedly taught by Parulski. The term 'differentiation' on the other hand, has to do with a detection of a change in a value of a pixel relative to one or more adjacent pixels over a single frame. In accordance with the present teachings, 'differencing' is performed between two or more frames, and 'differentiation' is performed over the differenced frame.

Differentiation highlights edges. On the other hand, on lines 39 through 44 of columns 5, Parulski focuses on the elimination of edges. The teachings of Parulski *et al.* and the other references, clearly do not anticipate the inventions of Claim 7 and the Claims dependent thereon.

Appellant respectfully submits that Claims 1, 3 – 12, and 14 – 20 are not unpatentable under 35 U.S.C. § 103(a) over Parulski et al. in view of Adelson. The Board's consideration and reversal of these rejections is respectfully requested.

D. Claims 19 and 20 are not unpatentable under 35 U.S.C. § 103(a) over Parulski et al. in view of Adelson and further in view of Astle et al.

Claims 19 and 20 were finally rejected over a newly cited Astle reference (U.S. Patent No. 4,827,344). Appellant respectfully submits that this rejection is improper.

The shortcomings of Parulski and Adelson with respect to the inventions of Claims 19 and 20 are discussed above. Hence, the question here is whether Astle overcomes the shortcomings of these references.

Astle purports to show apparatus for inserting part of one video image into another video image. Apparently, Astle was cited for its alleged teaching with respect to logical ANDing of picture elements. However, inasmuch as Astle clearly does not teach pixel-by-pixel comparison of two frames, the shortcomings of Parulski and Adelson are not overcome thereby. Claims 19 and 20 should, therefore, be allowable. Appellant respectfully requests consideration and reversal of this ground of rejection as well.

E. **Claims 1, 3 – 12 and 14 – 17 do not conflict with Claims 1 – 17 of Application No. 09/363,771.**

Claims 1, 3 – 12 and 14 – 17 were presumably rejected as conflicting with Claims 1 – 17 of Application No. 09/363,771.

Appellant respectfully requests that the Board take note of the fact that the 09/363,771 application has been abandoned. (See the Notice of Abandonment enclosed herewith as Exhibit C.)

F. **Summary of Arguments**

The final rejections of Claims 1, 3 – 12 and 14 – 20 under 35 U.S.C. § 103(a) as being unpatentable over Parulski in view of Adelson are improper inasmuch as neither of these references, taken alone or in combination, teach, disclose or suggest a system for extracting an image of an object, from a heterogeneous background scene, having means for **comparing** picture elements (pixels) of a current frame to those of a stored frame and selectively outputting picture elements in the current frame based on the result of the comparison.

The final rejections of Claims 19 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Parulski *et al.* in view of Adelson and further in view of Astle *et al.* are improper inasmuch as none of these references, taken alone or in combination, teach, disclose or suggest a system for extracting an image of an object, from a heterogeneous background scene, having means for

comparing picture elements (pixels) of a current frame to those of a stored frame and selectively outputting picture elements in the current frame based on the result of the comparison.

Claims 1, 3 – 12 and 14 – 17 do not conflict with Claims 1 – 17 of Application No. 09/363,771 inasmuch as the '771 application has been abandoned.

On March 3, 2003, the Appellant conducted a telephone interview with the Examiner's Supervisor (Mark Zimmerman). Copies of Appellant's Interview Summary and Mr. Zimmerman's Summary are enclosed herewith as Exhibits A and B. It is evident from these conflicting summaries that the Examiner and her Supervisor continue to seek to find a teaching in Parulski to support the final rejections. That is, during prosecution, the Examiner's argument in support of Parulski shifted from col. 6, lines 8 - 11 and element 22 of Fig. 1 in the Office Action dated May 22, 2002 to col. 2, lines 44 - 51 in the Office Action dated November 21, 2002 to col. 3, line 27 through col. 4, line 32 in the Supervisor's interview summary.

Essentially, the Supervisor is taking the position that even though it is not apparent where in the reference the teaching of pixel-by-pixel comparison may be found, it must be there somewhere because the reference (Parulski) achieves the same result. However, this is a *non sequitor* for many reasons. First, the teaching of pixel-by-pixel comparison is not found anywhere in any of the cited references as discussed above and specifically at col. 3, line 27 through col. 4, line 32 of Parulski.

Secondly, the presumption that the teaching must be there because the reference achieves the same result is unfounded. Either the reference provides the necessary teaching or it does not. The Board's confirmation that the test for patentability has not simply become a 'results' test is respectfully requested. Indeed, is not the test under 35 U.S.C. § 103(a) whether the subject matter taken as a whole would have been obvious to a person having ordinary skill in the art?

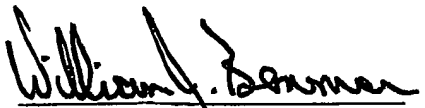
Finally, the Supervisor's presumption fails because the invention and Parulski's system achieve different results as is apparent from the discussion above and the teachings of the application and the cited reference.

Accordingly, reconsideration of the final rejections, reversal of the rejections, allowance of the claims and passage of the subject application to issue are respectfully requested of the Board by Appellant.

This Brief is being submitted in triplicate, and payment of the required Brief fee is contained in the Credit Card Payment Form. Please charge any fee (excluding the Issue Fee) that may be necessary for the continued pendency of this Application to my Credit Card.

Note: For convenience of detachment without disturbing the integrity of the remainder of pages of this Appeal Brief, Appellant's "APPENDIX" section is contained on separate sheets following the signatory portion of this Appeal Brief.

Respectfully submitted,



William J. Benman, Jr.
Appellant

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IX. APPENDIX

1. (Twice Amended) A system for extracting an image comprising:

first means for providing image data;

second means responsive to said first means for storing a first frame of image data consisting of a heterogeneous background scene;

third means responsive to said first means for providing a second frame of image data consisting of a second scene having said background scene at least partially obscured by a foreground object; and

fourth means responsive to said second and third means for processing said second frame to extract an image of said object independent of said background scene, said fourth means including:

means for comparing picture elements of said second frame to corresponding picture elements in said first frame; and

means for outputting said corresponding picture elements in said second frame if the result of the comparison is a predetermined value.

3. The invention of Claim 1 further including means for inserting said image of said foreground object into a third scene.

4. The invention of Claim 3 wherein said third scene is computer generated.

5. The invention of Claim 4 wherein said first scene is static.

6. The invention of Claim 5 wherein said second scene is dynamic.

7. (Twice Amended) A system for extracting images comprising:

first means for providing image data;

second means responsive to said first means for storing a first frame of image data consisting of a heterogeneous background scene;

third means responsive to said first means for providing a second frame of image data consisting of a second scene having said background scene at least partially obscured by a foreground object;

fourth means for subtracting said first frame from said second frame and providing a difference frame;

fifth means for processing said difference frame to provide a template, said fifth means including means for differentiating said filtered image to provide said template; and

sixth means for multiplying said second frame by said template to extract an image consisting essentially of said foreground object.

8. The invention of Claim 7 further including means for inserting said image of said foreground object into a third scene.

9. The invention of Claim 8 wherein said third scene is computer generated.

10. The invention of Claim 9 wherein said first scene is static.

11. The invention of Claim 10 wherein said second scene is dynamic.

12. The invention of Claim 7 wherein said fifth means includes means for filtering said difference frame.

14. (Amended) The invention of Claim 7 wherein said means for differentiating provides an outline.

15. The invention of Claim 14 wherein said fifth means includes means for filling said outline with a value.

16. The invention of Claim 15 wherein said value is a logical '1'.

17. An image processing method for extracting an image, said method including the steps of:

storing a first frame of image data consisting of a heterogeneous background scene;

providing a second frame of image data consisting of a second scene having said background scene at least partially obscured by a foreground object; and

processing said second frame to extract an image of said object independent of said background scene, said processing step further including the steps of:

comparing picture elements of said second frame to corresponding picture elements in said first frame and

outputting said corresponding picture elements in said second frame if the result of the comparison is a predetermined value.

18. The invention of Claim 1 wherein said means for outputting said corresponding picture elements includes means for logically gating picture elements in said current frame in response to the output of said means for comparing.

19. The invention of Claim 18 wherein said means for logically gating includes means for logically ANDing corresponding picture elements in said second frame with the output of said means for comparing.

20. The invention of Claim 19 wherein said means for logically gating includes means for logically ANDing corresponding picture elements in said second frame with an inverted output of said means for comparing.

EXHIBIT A

Virtual-2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	
W. Benman	:	Group Art Unit : 2671
Serial No. 09/363,456	:	Examiner: H. Cao
Filed: July 29, 1999	:	Date: February 26, 2003
For: System And Method For Extracting	:	
Images Without Monochromatic....	:	

APPLICANT'S INTERVIEW SUMMARY

Commissioner of Patents
and Trademarks
Washington, D. C. 20231

Sir:

In response to the Office Action dated November 21, 2002, Applicant has filed a Notice of Appeal and presents herewith the Interview Summary in connection with the above-identified Application:

This is to record the substance of a telephone interview held on this date with the Supervisor (Mark Zimmerman) of the Examiner of the above-identified patent application. The purpose of the interview was to review the Examiner's position set forth in the most recent official communication dated November 21, 2002. I indicated to Mr. Zimmerman that the Examiner's argument was weak and when the shortcomings of the Examiner's position were pointed out to her, she failed to come up with a reply that would be useful to us in our efforts to decide whether and how to continue the prosecution of the Application.

We discussed the merits of the rejection, particularly with respect to the Examiner's response to Applicant's arguments and the Parulski reference. I pointed out that inasmuch as Parulski uses a **differencing** scheme to create a mask, Parulski's approach is clearly different from that which we are claiming inasmuch as our approach uses a pixel by pixel **comparison** between two frames.

The Examiner's Supervisor asserted his position that inasmuch as Parulski creates a mask, at some point a comparison operation must be made. To support this argument, the Examiner's Supervisor made reference to column 3, lines 41 - 52 of the reference where Parulski mentions a comparison of pixel values to a pre-determined threshold. I pointed out to the Examiner that surely a pixel by pixel comparison of two frames is substantially different from a pixel by pixel comparison to a pre-determined fixed threshold. That is, the latter is essentially just a thresholding operation and not a comparison per se.

Nonetheless, Mr. Zimmerman indicated that this was his position and indicted a willingness to stand by it.

I pointed out that this constituted a new ground of rejection and requested that a new Office Action be sent out accordingly. The Examiner's Supervisor indicated that he did not intend to send out a new Office Action, and he suggested that we take whatever action we deemed appropriate at this time. I asked the Examiner's Supervisor to forward an Examiner's Interview Summary to us and he agreed to do so.

The interview then came to a close.

Respectfully submitted,

By 
William J. Benman

WJB/lc

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EXHIBIT B

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Washington, D.C. 20231
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/363,456	07/29/1999	WILLIAM J. BENMAN	VIRTUAL-2	8150

7590 03/03/2003

WILLIAM J BENMAN
INTEGRATED VIRTUAL NETWORKS
2049 CENTURY PARK EAST
SUITE 2740
LOS ANGELES, CA 90067

EXAMINER	
CAO, HUEDUNG X	

ART UNIT	PAPER NUMBER
2671	

DATE MAILED: 03/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Interview Summary	Application No. 09/363,456	Applicant(s) BENMAN, WILLIAM J.	
	Examiner Mark K Zimmerman	Art Unit 2671	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Mark K Zimmerman*. (3)_____.

(2) *William Benman*. (4)_____.

Date of Interview: *21 February 2003* .

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____ .

Claim(s) discussed: *1* .

Identification of prior art discussed: *Parulski* .

Agreement with respect to the claims f)☐ was reached. g)☒ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *Applicant argued that Parulski does not perform a pixel-by-pixel logical compare of two images to determine area of forground object. The examiner's position is that Parulski teachs the functional equivalent at column 3, line 27 through column 4, line 32.* .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i)☐ It is not necessary for applicant to provide a separate record of the substance of the interview(if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)
In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner should check the appropriate box at the bottom of the Form which informs the applicant that the submission of a separate record of the substance of the interview as a supplement to the Form is not required.

It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

EXHIBIT C

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

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09/363,771	07/29/1999	WILLIAM J. BENMAN	VIRTUAL-2	8530

7590 06/27/2002

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EXAMINER	
CAO, HUEDUNG X	
ART UNIT	PAPER NUMBER
2671	

DATE MAILED: 06/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

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Benman, Brown & Williams

Fax

Paralegal (BPAI)

To: ~~Examiner~~ Vasco Harper **From:** Yasmin Emerson

Fax: 703-308-7953 **Date:** July 15, 2004

Phone: 703-308-9797 **Pages:** 24 Including Cover

Re: 09/363,456 (Virtual-2) **CC:**

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

•Comments:

Paralegal (BPAI)

~~Examiner~~ Harper,

Per your request.

Sincerely,
Yasmin